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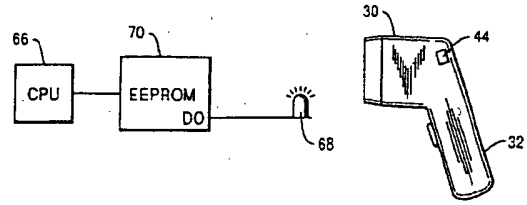
(54) Method and apparatus for programming an optical bar code scanner.

(57) The invention is arranged for storing programming binary data in a storage device (70), coupling a light emitting diode (68) to said storage device enabling the diode to be operated in accordance with the binary data stored in said storage means (70) and reading the output of said diode (68) with said bar code scanner and so enabling said scanner (32) reader to be programmed in response to reading said binary data.

FIG. 3



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The present invention relates to a method and apparatus for programming the operation of an optical bar code scanner.

The use of bar coded symbols or labels intended to be read by optical scanning equipment as a means for identifying data useful in processing items sold in the retail system has been widely accepted to the point that a particular bar code known as a Universal Product Code (UPC) has been established as the industry standard for the grocery and other related retail industries. In multiple bar code systems, such,as UPC, each decimal number or character is represented by two pairs of vertical bars and spaces within a 7-bit pattern wherein a binary 1 bit represents a dark module or bar of a predetermined width and a binary zero represents a light module or space. Thus, the decimal or character 1 may be represented in the UPC code by the 7-bit pattern 0011001. In keeping with this format, the decimal 1 would be comprised of an initial space of a 2-bit width, followed by a 2-bit wide bar, another 2-bit space and a 1-bit wide bar.

A multiple bar code, such as the UPC, is normally read by an optical scanner which may take the form of a hand-held wand or a scanner mechanism located in a check-out counter. The optical scanner will scan the bar code patterns and generate signals representing the bars and spaces for transmission to the processing apparatus which determines the character represented by the bar code pattern.

In the manufacture of the bar code scanner, the scanner is initially programmed to read a tag, to send the coded data to a remote microprocessor, to operate the laser and also the motor which operates a portion of the scanning optics producing a scan pattern for scanning the coded label. After the scanner has been installed in a checkout environment, conditions arise which require that certain functions of the scanner be changed. For example, the type of coded tag that is to be read might be changed requiring a different decoding system, the length of the tag may change and the communication interfaces together with the baud rate may be changed. Where these changes have occurred in the past, a service person was required to make such changes to the scanner.

It would be desirable to provide a method for altering the scanner functions which is simple and effective and does not require the services of a technician to make such changes.

It is thus an object of the present invention to provide a method and apparatus for changing the functions of a bar code scanner which is simple in its operation and low in cost.

According to one aspect of the present invention there is provided a method of programming an optical bar code scanner characterized by the steps of generating an optical signal representing programming data, locating said scanner so as to receive said signal and activating said scanner so as to read said signal and be programmed thereby.

According to another aspect of the present invention there is provided apparatus for programming an optical bar code scanner, characterized by storage means for storing binary programming data, output means coupled to said storage means and arranged for selectively outputting an optical signal representative of said programming data and means for activating said scanner to read said signal so as to be programmed thereby.

The invention is described further hereinafter, by way of example only, with reference to the accompanying drawings in which:-

Fig. 1 is a perspective view of a checkout system including a data terminal device and a handheld scanner mounted in a support member positioned adjacent the terminal device in accordance with an embodiment of the present invention;

Fig. 2 is a partial sectional view of the support member of Fig. 1 showing the printed circuit board on which is mounted a central processing unit, an EEPROM member and an LED member;

Fig. 3 is a schematic representation of the system for programming the hand-held bar code scanner of Fig. 1;

Fig. 4 illustrates a UPC bar code label.

Fig. 5 is a flow diagram illustrating the method for changing the operating functions of the bar code scanner of Fig. 1.

Referring now to Fig. 1, there is shown a perspective view of a checkout system 20 which includes a data terminal device 22 mounted on a checkout counter 24 on which is also mounted a box like support member 26 having an opening 28 in which is positioned the face portion 30 of a hand-held scanner 32. The data terminal device 22 includes a keyboard 34, a display 36 and a printer 38. The support member 26 includes a switch member 40 mounted in the front face portion 42 of the support member 26. The scanner 32 includes a switch 44 mounted on the side portion 46 of the scanner and a pair of indicators 48, 50 comprising red and green lights mounted on the rear portion 52 of the scanner indicating whether a satisfactory read operation had occurred. A cable 54 connects the optical scanner 32 and the support member 26.

Referring now to Fig. 2, there is shown a side sectional view of the support member 26 comprising a box like housing 56 which includes a recessed portion 58 forming the opening 28. Mounted at the lower portion of the recess portion 58 is a ring type support member 60 for supporting the face portion 30 (Fig. 1) of the scanner 32 adjacent the support member 60. As shown in Fig. 2, the recessed portion 58 is oriented at an angle to the vertical sides of the housing 56.

Mounted on the floor portion 62 of the housing 56 is a printed circuit board 64 on which is located a CPU

66, a light emitting diode (LED) 68, an EEPROM 70 and an integrated circuit 72. Mounted between the floor portion 62 and the printed circuit board 64 is a battery 74 for supplying power to the integrated circuit elements on the printed circuit board. The switch 40 mounted on the front face portion 42 of the housing 56 will, when actuated, enable the battery 74 to supply power to the LED 68 for use in programming the operation of the scanner 32. The cable 54 extending from the scanner 32 includes a conductor 76 which is connected to the printed circuit board 64.

Referring to Fig. 3, there is shown a schematic representation of the system for programming the bar code scanner 32 including the CPU 66 which is programmed to output control signals to the EEPROM 70 representing program data. In response to receiving the control signals, the EEPROM 70 will output a plurality of data signals to the LED 68 enabling the LED to be turned on and off in accordance with the data signals received from the EEPROM member 70. When the switch 44 on the scanner 32 is actuated, the scanner 32 will be put into a programming mode to scan the operating condition of the LED 68 resulting in the programming of the scanner 32 to scan a predetermined type of coded label for use in identifying the merchandise item on which the coded label is attached.

Referring now to Fig. 4, there is illustrated a symbol or coded label such as a UPC coded symbol which is scanned by the scanner 32 for generating coded data identifying the merchandise item to which the coded label is attached. As shown, each encoded UPC character is made up of 2 dark bars and 2 light spaces each composed of a different number of predetermined width modules. By assigning a 1 which corresponds to a black module and 0 to a white module, the left hand character represents (0101111) which denotes the character 6 and the right hand character represents (0001101) which denotes the character 0. The structure of the character code is not uniquely determined by each character, but is different according to which side of the centre of the UPC symbol the character is located on. It is thus arranged that the light modules and the black modules are reversed as the character is located on the right or left sides, and as a result an odd number of black modules is included in each character code on the left hand side and an even number of black modules is included in each character code on the right hand side. This parity relation provides information for determining the read-out direction of the codes. With this arrangement, the left-hand character always starts with light bars and the right-hand character always starts with dark bars (reading left to right). In the present embodiment, the energizing of the LED 68 will represent a dark bar 78 while the deenergizing of the LED represents the space 80. The scanner 32 includes a microprocessor (not shown) which will decode the data generated by the operation of the LED member for use in programming the scanner.

Referring now to Fig. 5 there is shown a flow diagram illustrating the method for programming the scanner 32 which includes setting the scanner to a programming mode to receive the programming data string (block 82) from the LED 68 by actuating the switch 44 on the scanner 32 (Fig. 1). The operator then actuates the switch 40 (Fig. 1) on the housing 56 enabling the EEPROM 70 to output the predetermined serial data to the LED 68 (block 84), operating the LED in accordance with the level of the signal received. The scanner 32 senses the operating condition of the LED 68, enabling the scanner to generate data in accordance with the data transmitted to the LED from the EEPROM 70. The data outputted from the EEPROM 70 includes a special character signaling the end of the string of data outputted by the operation of the LED 68. The scanner 32 detects whether that character is present (block 86), indicating the end of the string of data. If the special character is not present, the scanner 32 energizes the indicator light 48 (Fig. 1) indicating that the data string was not captured (block 88). If the special character is present, the scanner 32 energizes the indicator light 50 indicating that the data string has been captured (block 90) and that the scanner has been programmed in accordance with the data outputted by the EEPROM 70. It will be seen from this arrangement that the scanner can be programmed at any location, at any time that is feasible to the operation of the checkout system and that positive feedback is present to indicate to the operator that the scanner has been properly programmed.

Claims

1. A method of programming an optical bar code scanner (32), characterized by the steps of generating an optical signal representing programming data, locating said scanner (32) so as to receive said signal and activating said scanner (32) so as to read said signal and be programmed thereby.

2. A method according to claim 1, characterized by storing said programming data in storage means coupled to means for generating said signal.

3. A method according to claim 2, characterized by storing said data in an EEPROM (70).

4. A method according to claim 1, 2 or 3, characterized by said signal being output by way of a light emitting diode (68).

5. A method according to claim 4 characterized in that said light emitting diode (68), when energized, is arranged to represent a binary one bit of said data.

6. Apparatus for programming an optical bar code scanner (32), characterized by storage means (70) for storing binary programming data, output means (68) coupled to said storage means (70) and arranged for selectively outputting an optical signal representative of said programming data and means (44) for activating said scanner (32) to read said signal so as to be programmed thereby.

7. Apparatus according to claim 6, characterized in that said output means comprises a light emitting diode.

8. Apparatus according to claim 6 or 7, characterized in that said storage means (70) comprises an EEPROM (member).

9. Apparatus according to claim 6, 7 or 8, characterized in that said light emitting diode (68) is arranged to be energized to represent a binary one of said data.

FIG. 1

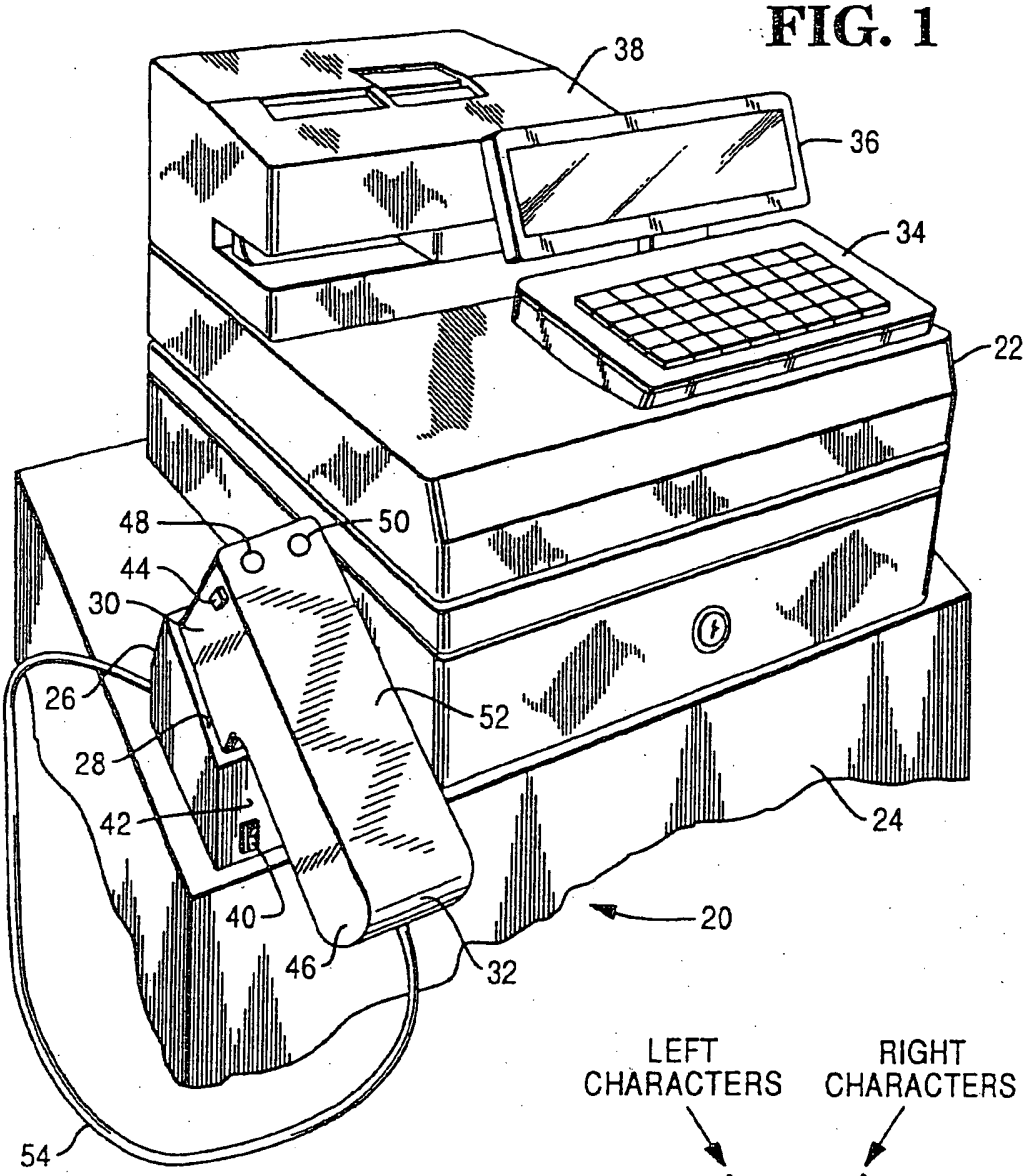


FIG. 4

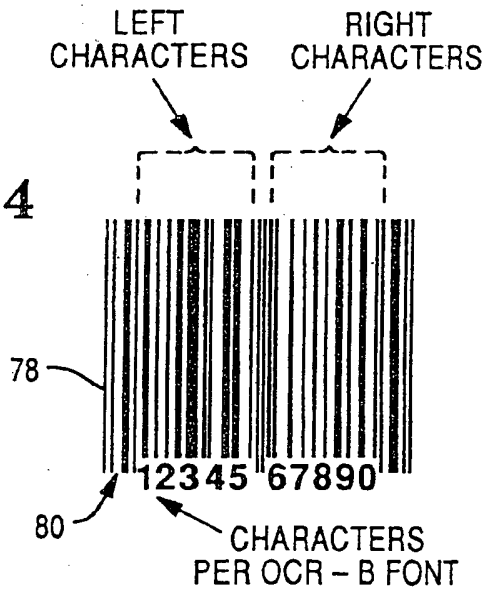


FIG. 2

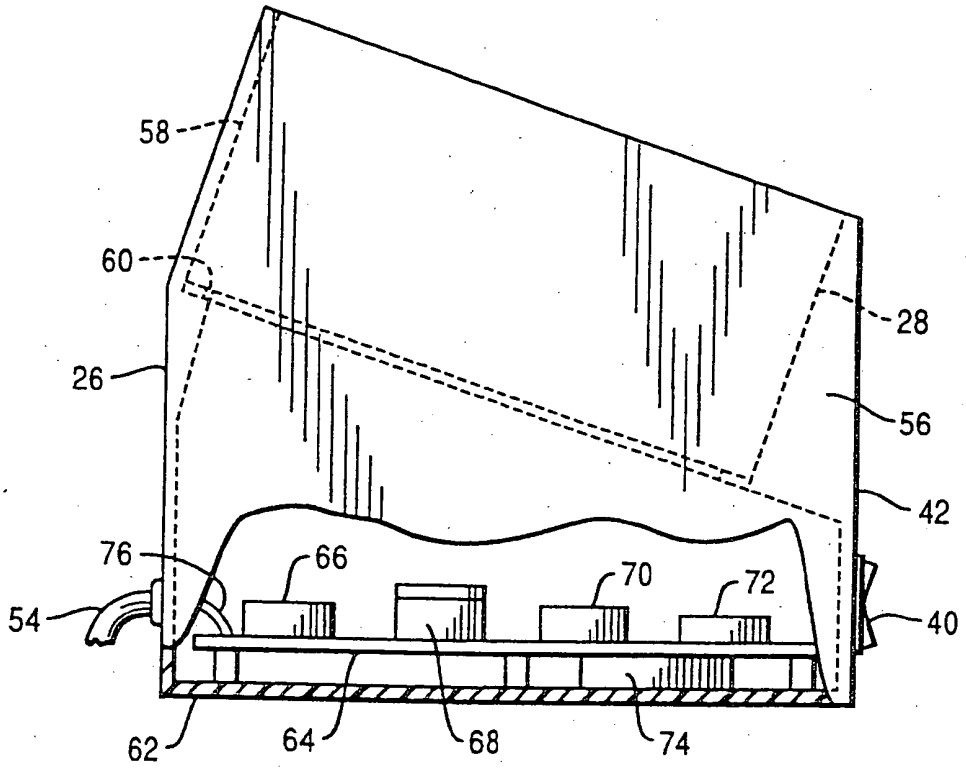


FIG. 3

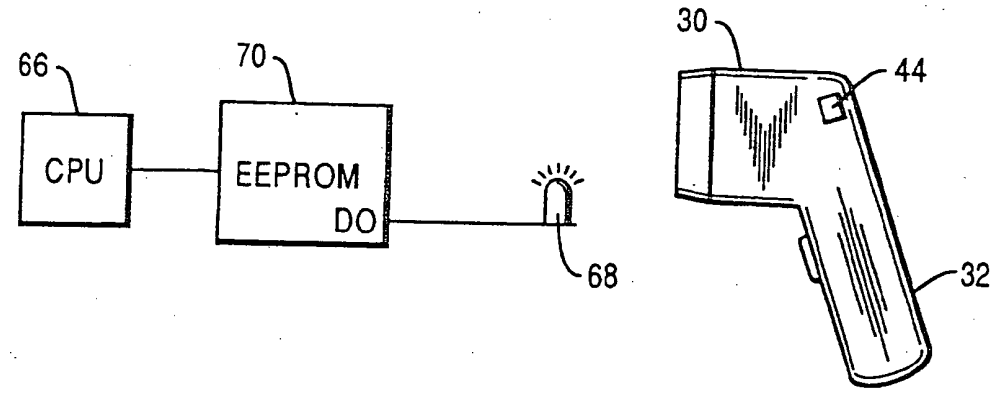
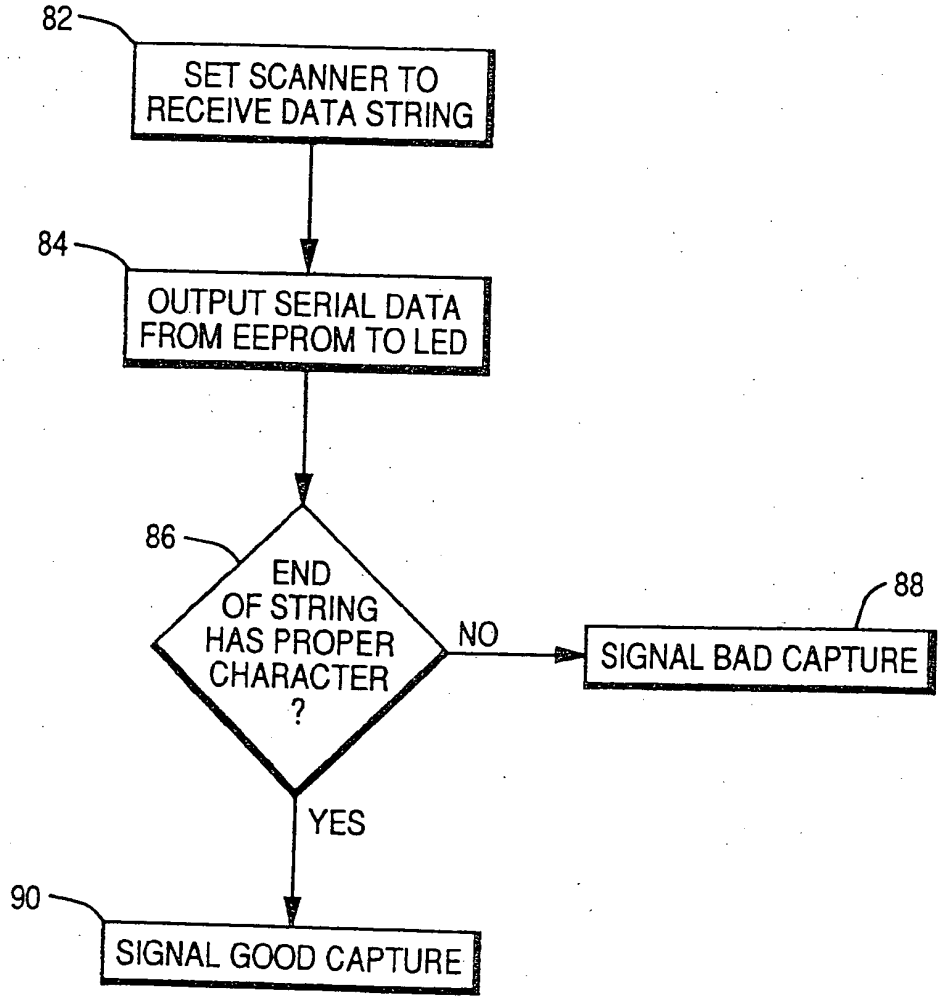


FIG. 5



European Patent Office

EUROPEAN SEARCH REPORT

Application Number EP 92 30 7369

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X Y	US-A-4 861 972 (ELLIOTT ET AL.) * column 5, line 27 - line 47; figure 1 *	1 2,4-7,9	G06K7/10 G06K17/00
Y	GB-A-2 228 641 (MEGGER INSTRUMENTS LIMITED) * page 2, line 19 - line 26; figure 1 *	2,4-7,9	
X A	US-A-4 902 883 (POLAND) * claim 4 *	1 6	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

G06K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	09 DECEMBER 1992	CHIARIZIA S.J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
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E : earlier patent document, but published on, or after the filing date
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